pass (d-axis) and sections where a magnetic flux cannot easily pass (q-axis) are alternately formed, and made of a rotor iron core having permanent magnets in cavities,

wherein the stator satisfies a relationship of:

$0.45 \leqq W_t/\tau \leqq 0.8$,

where τ (m) indicates the pitch of the slot and W_t (m) indicates the width of the teeth.

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-11 are pending in the present application with Claim 10 having been amended by the present amendment.

In the outstanding Office Action, Claim 10 was rejected under 35 U.S.C. §112, first paragraph; Claims 1-3, 10 and 11 were rejected under 35 U.S.C. §103(a) as unpatentable over Sakai et al (U.S. Patent No. 6,274,960); Claims 4-7 were rejected under 35 U.S.C. §103(a) as unpatentable over Uchida et al; and Claims 8 and 9 were rejected under 35 U.S.C. §103(a) as unpatentable over Sakai et al in view of Sakai (U.S. Patent No. 6,087,751).

Regarding the rejection of Claim 10 under 35 U.S.C. §112, first paragraph, Claim 10 has been amended to recite that the stator satisfies the claimed relationship (rather than the rotor satisfying the claimed relationship). The stator 1 is shown in Figure 10, for example, and the claimed relationship is shown in Figure 11. Accordingly, it is respectfully requested this rejection also be withdrawn.

Claims 1-3, 10 and 11 stand rejected under 35 U.S.C. §103(a) as unpatentable over Sakai et al. This rejection is respectfully traversed.

Independent Claim 1 recites that the rotor satisfies a relationship of $PL/2\pi RW_{qave} \geqq 130$, where W_{qave} (m) indicates an average thickness of the rotor iron core on an outer side in a radial direction of the rotor with respect to cavities arranged in a q-axis direction, L(m) indicates a width in a circumferential direction of the cavities, P indicates the number of poles and R(m) indicates the radius of the rotor. Similarly, independent Claim 10 is directed to a permanent magnet type reluctance electric motor in which the rotor satisfies a relationship of $0.45 \leqq W_t/\tau \leqq 0.8$, where τ (m) indicates the pitch of the slot and W_t(m) indicates the width of the teeth.

In the previous amendment filed January 28, 2003, Applicants presented arguments that "[the] present inventors advantageously determined a correlation between the $PL/2\pi RW_{qave}$ dependency of torque and the torque (as shown in Figure 5 and as recited in Claim 1) and a correlation between the W_t/τ dependency of torque and the torque (see Figure 11 and as recited in Claim 10), and determined these claimed ranges are critical and that they produce unexpected results."

In response to these arguments, the outstanding Office Action maintains the previous rejection for the same reasoning and states that "in every prior art invention, the dimensions of the cavities are always optimized to achieve maximum torque efficiency and there is no evidence that prior art torque effeciency is less than 95 percent." See item 6 at page 8. The outstanding Office Action also indicates the claimed ranges would have been obvious to one skilled in the art at the time the invention was made based on discovering the optimum or workable ranges involves only routine skill in the art.

Applicants again respectfully traverse this rejection. First, Applicants respectfully submit they are not required to provide evidence that the prior art torque efficiency is less than 95 percent. Second, the claimed relationships were not discovered on mere optimum or

workable ranges. Rather, the present inventors determined a novel relationship between a selected number of variables and how the relationship of the selected variables has a dependency on torque. In Claim 1, the variables include P, L, R and W_{qave} (see Figure 4) and the present inventors advantageously determined that when the claimed relationship between these selected variables $PL/2\pi RW_{qave}$ is greater than or equal to 130, a torque having 95% or more of the maximum torque value is obtained, which is higher than that obtained by conventional designing (see Figure 5 and page 16, line 27 to page 17, line 4).

That is, the claimed relationships include particularly selected dimensions (variables) and how the relationship between these selected dimensions affects the torgue. The applied art and the remarks in the outstanding Office Action give no reason why one skilled in the art would know to optimize the claimed result effective selected variables and their relationship between each other to achieve the improved result.

Accordingly, it is respectfully submitted independent Claims 1 and 10 and each of the claims depending therefrom are allowable.

Claims 4-7 stand rejected under 35 U.S.C. §103(a) as unpatentable over Uchida et al. This rejection is respectfully traversed.

Similar arguments apply to independent Claims 4 and 6. That is, Applicants respectfully submit the claimed relationships in Claims 4 and 6 are between selected dimensions and their relationship on torque (see Figures 8 and 9). The claimed relationships were not determined through mere experimentation. That is, as discussed above, the claimed ranges are critical and produce unexpected results.

Accordingly, it is respectfully submitted independent Claims 4 and 6 and each of the claims depending therefrom are also allowable.

Claims 8 and 9 stand rejected under 35 U.S.C. §103(a) as unpatentable over Sakai et al in view of Sakai. This rejection is respectfully traversed.

Claims 8 and 9 depend on Claim 1, which as discussed above is believed to be allowable. Further, it is respectfully submitted Sakai also do not teach or suggest the claimed ranges. Accordingly, it is respectfully requested this rejection also be withdrawn.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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IN THE CLAIMS

--10. (Twice Amended) A permanent magnet type reluctance electric motor comprising:

a stator including a stator iron core and having armature coils placed inside slots; and

a rotor provided with a plurality of magnetic barriers formed by cavities and placed on an inner side of the stator in such a manner that sections where a magnetic flux can easily pass (d-axis) and sections where a magnetic flux cannot easily pass (q-axis) are alternately formed, and made of a rotor iron core having permanent magnets in cavities, [characterized in that]

wherein the [rotor] stator satisfies a relationship of:

$0.45 \leq W_t/\tau \leq 0.8$,

where τ(m) indicates the pitch of the slot and W_t (m) indicates the width of the teeth.--